SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA

MasterofComputerApplications(w.e.f.2023onwards)

Course Structure & Syllabus for AB 2023-24

Semester I (First Year) Curriculum

Code	CourseTitle	Max Marks		Total Marks	Hoursper week		Credits
		External	Internal		Theory	Practical	
23MCAT101	DiscreteMathematical Structures	70	30	100	4	-	4
23MCAT102	ManagementAccountancy	70	30	100	4	-	4
23MCAT103	CProgramming& Data Structures	70	30	100	4	-	4
23MCAT104	ComputerOrganization	70	30	100	4	-	4
23MCAT105	OperatingSystems	70	30	100	4	-	4
23MCAT106	Design&Analysis of Algorithms	70	30	100	4	-	4
23MCAP107	CProgramming&Data Structures Lab	50	50	100	-	3	2
23MCAP108	OperatingSystems and ComputerOrganizationLab	50	50	100	-	3	2
23MCAP109	SkillDevelopment Course/ MOOCS	50	50	100	-	3	2
23MCAT110	**Bridge Course*** FundamentalsofComputers (For General B.Sc/B.A./B.ComStudents)	70	30	100	4	-	4
23MCAP111	**BridgeCourseLab*** Fundamentals of Computers Lab (For General B.Sc/B.A./B.ComStudents)	50	50	100	-	3	2
	Total Credits						30

Note: All the General B.Sc/B.A./B.Com Students must pass the **Bridge Course(23MCAT110) and Bridge Course Lab (23MCAP111)** with minimum 50% marks, but the credits allotted for that courses will not be considered for SGPA calculation.

CourseCode&Title:23MCAT101DISCRETEMATHEMATICALSTRUCTURES
Semester:I
CourseIndex: C101

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
Learnaboutintroductionofdiscretemathematicalstructures.
LearntheCountingTechniquesandPermutationsandcombinations.
LearnaboutindetailaboutGraphsandConnectivity.
LearnaboutindetailaboutTrees, Spanningtreesandtheirapplications
Learnabout BooleanAlgebra,RepresentingBooleanfunctionsandMinimizationofBoolean functionsand Models of Computation.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C101.1	Understandaboutintroductionofdiscretemathematicalstructures.
C101.2	UnderstandtheCountingTechniquesandPermutationsandcombinations.
C101.3	UnderstandaboutindetailaboutGraphsandConnectivity.
C101.4	UnderstandaboutindetailTrees,SpanningTrees andtheir applications.
C101.5	UnderstandaboutBooleanAlgebra,RepresentingBooleanfunctionsand Minimization of Boolean functionsand Models of Computation.

23MCAT101DISCRETEMATHEMATICALSTRUCTURES

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal:30Marks **External:70Marks** **Total:100Marks**

UNITI

Introduction: Logic-Prepositional Equivalences-Truth tables-Tautologies-Predicates and Quantifiers-Sets-Operations on sets.

Relations: Relations and their properties- binary relations and their applications - Representation of relations- Closures of relations- Equivalence relations-Partial Orderings.

UNITII

Counting Techniques: BasicsofCounting –Introduction, Basic Counting Principles-Product Rule, Sum Rule- Pigeonhole Principle- Introduction, The Generalized Pigeonhole Principle.

Permutations and Combinations: Introduction, Permutations, Combinations- Generalized Permutations and Combinations-Permutations with repetition, Combinations with Repetition.

UNITIII

Graphs: Introduction to Graphs-Terminology-Basic terminology, Handshaking Theorem-Sample Graphs, Bipartite Graphs- Representations of Graphs and Graph Isomorphism – Adjacency matrices, Incidence matrices, Isomorphism of Graphs.

Connectivity: Introduction, Connectedness inUndirectedGraphs, Connectedness inDirected Graphs-Euler and Hamiltonian Paths- Shortest Path problems- Dijkstra's Algorithm-Planar Graphs- Graph Coloring.

UNITIV

Trees: Introduction to trees,Properties ofTrees- Applications oftrees- Binary Search Trees, Decision Trees, Prefix Codes- Tree Traversals- Introduction, Traversal Algorithms, Infix, Prefix, and Postfix Notation.

Spanning Trees: Introduction, Depth First Search, Breadth First Search- MinimumSpanning Trees- Introduction, Algorithms for Minimum Spanning Trees- Prim's Algorithm, Kruskal's Algorithm.

UNITV

Boolean Algebra: Introduction, Boolean Expressions and Boolean Functions, Identities of Boolean Algebra - Representing Boolean Functions- Sum-of-Products Expansions- Logic Gates- Examples of Circuits, ADDERS-Minimizations of Circuits-Karnaugh Maps.

Modeling Computation: Languages and Grammars,Finite State Machines with Output, Finite State Machines with No Output.

TextBook:

1. Discretemathematicsanditsapplications,Keneth.H.Rosen,TataMcGraw-Hill Publishing Company, New Delhi

ReferenceBooks:

1. DiscreteMathematicsforcomputerscientists&Mathematicians,JoeL.Mott,Abraham

Kandel&T.P.Baker,PrenticeHallofIndiaLtd,NewDelhi

2. Discretemathematics,RichardJohnsonbaug,PearsonEducation,NewDelhi

***Note: RequesttothePaperSettertoconsiderthestudentsareComputerScienceandsetasper Computer related Questions.**

CourseCode&Title:23MCAT102MANAGEMENT ACCOUNTANCY
Semester:I
CourseIndex: C102

Course Objectives:
Thelearning objectivesofthiscourse are:

CourseObjectives
LearnthebasicconceptofPrinciplesOf AccountingandFinalAccounts.
LearnaboutindetailaboutRatioAnalysis.
LearnabouttheconceptsofCosting, BudgetandBudgetaryControl
LearnaboutMarginalCosting
LearningtheIntroductionToComputerizedAccountingSystem.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C102.1	UnderstandthebasicconceptofPrinciplesOfAccountingandFinalAccounts.
C102.2	UnderstandaboutindetailaboutRatioAnalysis.
C102.3	UnderstandabouttheconceptsofCosting,BudgetandBudgetaryControl
C102.4	UnderstandaboutMarginalCosting.
C102.5	UnderstandingtheIntroductionToComputerizedAccountingSystem.

23MCAT102MANAGEMENTACCOUNTANCY

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal:30 Marks **External: 70 Marks** **Total:100Marks**

UNIT I

Principles of Accounting: Nature and Scope of Accounting, Double Entry System ofaccounting introduction to Basic Books of Accounts of Sole Proprietary Concern, closing of books of accounts and Preparation of Trial Balance. Final Accounts: Trading, Profit and Loss Accounts and Balance Sheet of Sole Proprietary Concern with Normal Closing Entries (With numerical problems).

UNITII

Ratio Analysis: Meaning, Advantages, Limitations, Types of Ratio and their usefulness. (Theory only)Fund Flow Statement: Meaning of the Term Fund, Flow of Fund, Working Capital Cycle, Preparation and Inter-preparation of Statement.

UNITIII

Costing: Nature, Importance and Basic Principles. Budget and Budgetary Control: Nature and Scope, Importance, Method of Finalization and Master Budget, Functional Budgets.

UNITIV

Marginal Costing: Nature, Scope, Importance, Construction of Break Even Chart, Limitations and uses of Break Even Chart, practical applications of marginal costing (with numerical problems).

UNITV

Introduction to Computerized Accounting System: Coding Logic and Codes Required, Master Files, Transaction Files, Introduction to documents used for data collection, processing of different files and outputs obtained.

TEXTBOOKS:

1. IntroductiontoAccountancy.T.S. Grewal.
2. ManagementAccountancy,S.P.Jain.

REFERENCEBOOK:

1. Introductionto Accounting,G.Agarwal.

CourseCode&Title:23MCAT103CPROGRAMMINGANDDATASTRUCTURES
Semester:I
CourseIndex: C103

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearntheFundamentalsandBasicconceptsofC Programming.
LearnaboutindetailaboutArrays,FunctionsandPointers.
LearnaboutthePointeranditsimportance
LearntheconceptsofDerivedDataTypesandData Structures.
LearntheconceptsofLinkedLists,Trees,Graphs,SearchingandSorting.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C103.1	UnderstandtheFundamentalsandBasicconceptsofCProgramming.
C103.2	UnderstandaboutindetailaboutArrays,Functions.
C103.3	UnderstandtheconceptsofPointersanditsapplications
C103.4	UnderstandtheconceptsofDerivedDataTypesandDataStructures.
C103.5	UnderstandtheconceptsofLinkedLists,Trees,Graphs,SearchingandSorting.

23MCAT103CPROGRAMMINGANDDATASTRUCTURES

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal: 30 Marks **External: 70 Marks** **Total:100Marks**

UNIT-I

IntroductiontoComputers, Algorithm,flowchart,programdevelopmentsteps,StructureofC program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedenceandorder ofevaluation. Controlstructuressuchas if, go to, labels, and switch statements. Loops- while, do-while and for statements, break, continue.

UNIT-II

Arrays: Arrays - declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1- D arrays, 2-D arrays – 2-D and character arrays – Multidimensional arrays. **Functions:** basics, parameter passing, storage classes- scope rules, user defined functions, standard library functions, recursive functions, header files, C pre-processor.

UNIT-III

Pointers: Concepts, initialization of pointer variables, pointers and Function arguments, passing byaddress –dangling memory, Characterpointer sand functions, pointer sto pointer s, pointer sandmultidimensionalarrays, dynamic memorymanagement functions, command line arguments.

UNIT-IV

Derived types: structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers tostructures, self-referential structures, unions, typed of, bit-fields, Input and output – concept ofa file, text files and binary files, Formatted I/o, file I/o operations.

Data Structures: Introduction to Data Structures – Stacks: Definition, Stack implementation one application; Queues: Definition, Queue implementation and types of Queues.

UNIT-V

Linked Lists: SingleLinkedList- Definition, implementation;DoubleLinkedList- Definition, implementation. **Trees:** Binary Trees- representation, traversals. **Graphs:** Introduction, representation,traversals.**Searching:**LinearSearchingandBinarySearching.**Sorting:**Bubble Sort, Quick Sort and Merge Sort.

TEXTBOOKS:

1. CandDataStructures:Asnapshotorientedtreatiseusing liveengineeringexamples,NB Venkateswarlu, E. V Prasad, S Chand &Co.
2. LetUsC,YashwantKanetkar, BPBPublications, 5th Edition.
3. Computerscience,AstructuredprogrammingapproachusingC,B.A.Forouzanand R.F.Gilberg, Third edition, Thomson.

REFERENCEBOOKS:

1. FundamentalsofDataStructuresinC,Horowitz,Sahni,Anderson-Freed,2nded,2008.
2. TheCProgrammingLanguage,B.W.Kernighan,DennisM.Ritchie,PHI/Pearson.

CourseCode&Title:23MCAT104COMPUTERORGANIZATION
Semester:I
CourseIndex: C104

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
LearnthebasicsofDigitalLogicCircuitsandDigitalComponents.
LearnabouttheConceptsofDataRepresentation,RegisterTransferandMicroOperations.
LearntheconceptofAssemblyLanguageInstructions,8085 Microprocessor InstructionSet Architecture ,Basic Computer Organization and Design . Central Processing Unit.
LearnabouttheconceptofCentralProcessingUnit,Input/OutputOrganization.
LearnaboutthePriorityinterrupt,DirectMemoryAccessandMemoryOrganization.

Course Outcomes:
Bytheendofthe course,the studentwillbe

CourseIndex	CourseOutcomes
C104.1	UnderstandthebasicsofDigitalLogicCircuitsandDigitalComponents.
C104.2	UnderstandabouttheConceptsofDataRepresentation,RegisterTransferand MicroOperations.
C104.3	Understand the concept of Assembly Language Instructions, 8085 MicroprocessorInstructionSetArchitecture,BasicComputerOrganizationand Design.CentralProcessingUnit.
C104.4	UnderstandabouttheconceptofCentralProcessingUnit,Input/Output Organization.
C104.5	UnderstandabouttheconceptofPriorityinterrupt,DirectMemoryAccessand Memory Organization.

23MCAT104COMPUTERORGANIZATION

Instruction:4Periods/week **Time:3 Hours** **Credits:4**
Internal: 30 Marks **External: 70 Marks** **Total:100Marks**

UNIT-I

DigitalLogicCircuits:

DigitalComputers,LogicGates,BooleanAlgebra,MapSimplification,CombinationalCircuit, Flip-flops Sequential Circuits.

Digital Components:

IntegratedCircuits,Decoders,Multiplexers,Registers,ShiftRegisters,Counters,MemoryUnit.

UNIT-II

DataRepresentation:

DataTypes,Complements,Fixed-pointRepresentation,FloatingpointRepresentation.

RegisterTransferand MicroOperations:

Register Transfer Language, Register Transfer, Bus and Memory Transfer, Arithmetic MicroOperations.

UNIT-III

AssemblylanguageInstructions,8085MicroprocessorInstructionSetArchitecture.

BasicComputerOrganization and Design:

InstructionCodes,ComputerRegister,ComputerInstructions,TimingandControl,Instruction Cycle, Memory Reference Instructions, Input-Output, Interrupt.

UNIT-IV

CentralProcessingUnit:

Introduction, GeneralRegisterOrganization,Stackorganization,Instructionformats,addressing modes.

Input/Output Organization:

PeripheralsDevices,I/O Interface,AsynchronousDataTransfer,ModesofTransfer

UNIT-V

PriorityInterrupt,Directmemoryaccess,Input–Output Processor(IOP).

MemoryOrganization:

MemoryHierarchy,Mainmemory,AuxiliaryMemory, AssociateMemory,CacheMemory and Virtual Memory.

TextBooks:

1. ComputerSystemArchitecture,M.MorrisMano,PrenticeHallofIndiaPvt.ltd.Third Edition, Sept. 2008.

ReferenceBooks:

1. ComputerArchitectureandOrganization, WilliamStallings,PHIPvt.Ltd.EasternEconomy Edition, Sixth Edition, 2003.
2. Computer SystemArchitectureJohnP.Hayes.
3. ComputerArchitectureAQuantitativeapproach3rdEditionJohnL.Hennessy&David A. Patterson Morgan Kufmann (An Imprint of Elseveir)

CourseCode&Title:23MCAT105OPERATINGSYSTEMS

Semester: I

CourseIndex: C105

Course Objectives:

Thelearningobjectivesofthiscourseare:

CourseObjectives
LearntheconceptofIntroductiontoOperatingSystemsandProcessManagement.
LearnaboutProcessSynchronizationandDeadlocksindetail.
Learnabout theconceptofMemoryManagement andvirtualmemory.
LearnabouttheconceptofFileSystemImplementation, Mass-storagestructure.
LearntheconceptofProtectionandCaseStudy.

Course Outcomes:

Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C105.1	Understandtheconcept ofIntroductiontoOperatingSystemsandProcess Management.
C105.2	UnderstandaboutProcessSynchronizationandDeadlocksindetail.
C105.3	UnderstandaboutProcess memorymanagementandvirtualmemory
C105.4	UnderstandabouttheconceptofFileSystemImplementation, Mass-storage structure.
C105.5	UnderstandtheconceptofProtectionandCaseStudy.

23MCAT105OPERATINGSYSTEMS

Instruction:4Periods/week **Time:3 Hours** **Credits: 4**
Internal:30Marks **External:70Marks** **Total:100Marks**

UNITI

Introduction: Definition of Operating System, Types Of Operating Systems, OperatingSystem Structures, Operating-System Services, System Calls.

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads,InterProcessCommunication,ProcessScheduling,Scheduling Algorithms,Multiple - Processor Scheduling. Thread Scheduling.

UNITII

ProcessSynchronization: TheCriticalSectionProblem,Semaphores,And ClassicalProblems of Synchronization, Critical Regions, Monitors, Synchronization examples.

Deadlocks: Principles of Deadlocks, System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Avoidance, Detection & Recovery fromDeadlocks.

UNITIII

Memory Management: Logical Versus Physical Address, Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation.

VirtualMemory:Introduction, DemandPaging,PageReplacementAlgorithms, Thrashing.

UNITIV

File System Implementation: Concept of a file, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers.

Mass-storage structure: overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

UNITV

Protection: GoalsandPrinciplesofProtection,Accessmatriximplementation,Accesscontrol, Revocation of access rights.

Casestudy:LINUX,WindowsOperating Systems.

TextBook:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,PeterGalvin,GregGagne.
Seventh Edition, Wiley Publication

ReferenceBooks:

1. OperatingSystems,WilliamStallings5thEdition-PHI
2. ModernOperatingSystems,AndrewS.Tanenbaum,2ndedition,1995,PHI.
3. OperatingSystems-Aconceptbasedapproach,Dhamdhere,2ndEdition,TMH,2006.
4. UnderstandingtheLinuxKernel,DanielPBovet andMarcoCesati,3rdEdition,'Reilly, 2005.

CourseCode&Title:23MCAT106DESIGNANDANALYSISOFALGORITHMS
Semester:I
CourseIndex: C106

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives

Tolearnaboutthe AsymptoticNotations,MathematicalAnalysis ofNon-recursiveandrecursive Algorithms and sorting techniques.
TolearnabouttheDivide-and-Conquertechnique,Decrease-and-ConquerandTransform-and- Conquer techniques.
TolearnabouttheDynamicProgramming.
TolearnaboutGreedyTechnique,the DecisionTrees,P,NPandNP-completeproblems.
TolearnaboutBacktracking,Branch-and-Bound,ApproximationAlgorithmsforNP-hard Problems.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

C106.1	UnderstandabouttheAsymptoticNotations,MathematicalAnalysisofNon-recursive and recursive Algorithms and
C106.2	Selection Sort and Bubble sort, Sequential Search and Exhaustive Search.UnderstandabouttheDivide-and-Conquertechnique,Decrease-and-Conquer.
C106.3	Transform-and-Conquertechniques.UnderstandtheOptimalBinarySearch Trees, The Knapsack Problem.
C106.4	Prim'sAlgorithm,Kruskal'sAlgorithm,Dijkstra'sAlgorithm. UnderstandabouttheDecisionTrees,P,NPandNP-completeproblems,
C106.5	Backtracking,Branch-and-Bound,ApproximationAlgorithmsforNP-hard Problems.

23MCAT106DESIGNANDANALYSISOF ALGORITHMS

Instruction: 4Periods/week **Time:3Hours** **Credits: 4**
Internal: 30Marks **External: 70Marks** **Total:100Marks**

UNIT I

Introduction: Fundamentals of algorithmic problem solving, important problem types.

Fundamentals of analysis of algorithms and efficiency: Analysis framework, Asymptotic Notations and Basic Efficiency classes, Mathematical Analysis ofNon-recursive Algorithms, Mathematical Analysis of recursive Algorithms, Empirical Analysis of Algorithms, Algorithm Visualization.

UNITII

Brute Force: Selection Sort and Bubble sort, Sequential Search and Exhaustive Search.

Divide-and-Conquer: MergeSort,Quicksort, BinarySearch, BinaryTreeTraversalsand Related Properties.

Decrease-and-Conquer: InsertionSort,Depth-FirstSearchandBreadth-FirstSearch-Topological Sorting, Decrease-by-a-Constant-Factor Algorithms.

UNITIII

Transform-and-Conquer: BalancedSearchTrees,HeapsandHeapsort,Problem Reduction.

DynamicProgramming: Warshall'sandFloyd'sAlgorithm,OptimalBinarySearchTrees, The0/1 Knapsack Problem and Memory Functions.

UNITIV

GreedyTechnique: Prim'sAlgorithm,Kruskal'sAlgorithm,Dijkstra'sAlgorithm

LimitationsofAlgorithmPower: DecisionTrees,P,NPandNP-completeproblems.

UNITV

CopingwiththeLimitationsofAlgorithmsPower:**Backtracking**-n-queensproblem, Hamiltonian circuit problem, Subset-sum problem.

Branch-and-Bound-TheKnapsackProblem, TravellingsalespersonProblem,

ApproximationAlgorithmsforNP-hardProblems.

TextBook:

1. IntroductiontoDesign&AnalysisofAlgorithmsbyAnanyLevitin,Pearson Education, New Delhi, 2003

ReferenceBooks:

1. IntroductiontoAlgorithmsbyThomasH.Corman, CharlesE.Leiserson,RonaldR. Rivest& Clifford Stein, Prentice Hall of India, NewDelhi.
2. TheDesignandAnalysisofcomputerAlgorithms, Aho,Hopcroft &Ullman, Pearson Education, New Delhi, 2003
3. Fundamentalsofalgorithmics, GillesBrassard&PaulBratley, PrenticeHallof India, NewDelhi

CourseCode&Title:23MCAP107CPROGRAMMINGANDDATASTRUCTURESLAB
Semester:I
CourseIndex: C107

CourseObjectives: Thelearning objectivesofthiscourse are:

CourseObjectives
Learnhowtowritecodefordifferent typesofprogramsusingC Programming.
Learnhowto writecodeprograms ofDataStructures.
Learnhowto write/codeandownprograms usingCProgramming.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C107.1	AbletowritecodefordifferentC Programming. typesofprogramsusing
C107.2	AbletowritecodeprogramsofData Structures.
C107.3	Thestudentsareableto write/codeandownprograms usingCProgramming.

23MCAP107:CPROGRAMMINGANDDATASTRUCTURESLAB

Instruction: 3Hrs/week	**Time:3Hours**	**Credits: 2**
Internal:50Marks	**External:50Marks**	**Total:100Marks**

1. Write a C program to read x, y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What is the output from your program if the three given points are in a straight line?
2. Write a C program which generates 100 random numbers in the range of 1 to 100. Store them in an array and then print the array. Write 3 versions of the program using different loop constructs (eg. for, while and do-while).
3. Write a programwhich determines the largest and the smallest number that can be stored in different datatypes like short, int, long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
4. Write a C program which generates 100 random real numbers in the range of 10.0 to 20.0 and sort them in descending order.
5. Write a C function for transporting a square matrix in place (in place means that you are not allowed to have full temporary matrix).
6. WriteaCfunction,whichwillinvertamatrix.
7. Write a set of string manipulation functions eg. for getting a sub-string from a given position, copying one string to another, reversing a string and adding one string to another.
8. WriteaCprogramforsortingalistusingBubblesortandthenapplybinarysearch.
9. WriteaCprogramto implement theoperationsonstacks.
10. WriteaCprogramto implement theoperationsoncircular queues.
11. WriteaCprogramfortherepresentationofpolynomialsusingcircular linked list and for the addition of two such polynomials.
12. WriteaCprogramfor quicksort.
13. WriteaCprogramfor Mergesort.
14. WriteaCprogramtocreateabinarysearchtree andfor implementingthe inorder, preorder, Post order traversal using recursion.
15. WriteaCprogramforfindingtheDepthFirstSearchofagraph.
16. WriteaCprogramfor finding theBreadthFirstSearchofagraph.

REFERENCEBOOKS:

1. Let UsC,YashwantKanetkar,BPBPublications, 5thEdition.
2. ComputerScience,AstructuredprogrammingapproachusingC",B.A.Forouzanand R.F.Gilberg, 3rd Edition, Thomson, 2007.
3. TheC–ProgrammingLanguage'B.W.Kernighan,DennisM.Ritchie,PHI
4. DataStructuresandAlgorithms,2008,G.A.V.Pai,TMH
5. ClassicDataStructures,2/e,Debasis,Samanta, PHI,2009

CourseCode&Title:23MCAP108OPERATINGSYSTEMSAND COMPUTER ORGANIZATION LAB

Semester:I

CourseIndex: C108

Course Objectives:

Thelearningobjectivesofthiscourseare:

CourseObjectives
Learnhowto writecodeinUNIXoperatingsystemusingsomebasiccommands.
LearnhowtowritecodesomebasicprogramsusingShellProgramming.
Learnhowtowrite/codedifferenttypesofalgorithmsusingC/C++/JAVA.
LearnhowtodoDigitalLogicDesignExperiments
Learnhowtodo8085/86AssemblyLanguage Programs

Course Outcomes:

Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C108.1	Thestudents abletowritecodein UNIXoperatingsystemusingsomebasic commands.
C108.2	Thestudents abletowritecodesomebasicprograms usingShellProgramming.
C108.3	Thestudentsareabletowrite/codedifferenttypesofalgorithms using C/C++/JAVA.
C108.4	Thestudents abletodoDigitalLogicDesignExperiments
C108.5	Thestudents abletowrite8085/86AssemblyLanguagePrograms

23MCAP108OPERATINGSYSTEMSANDCOMPUTERORGANIZATIONLAB

Practical:3Periods /week **Time:3 Hours** **Credits:2**
Internal:50Marks **External:50Marks** **Total:100Marks**

OPERATING SYSTEMS LAB

1. BasicUNIX commands

ImplementthefollowingusingShellProgramming

2. Inputnumber evenorodd.
3. Countthenumberoflines intheinputtext.

ImplementthefollowingusingC/C++/JAVA

4. FCFSCPUschedulingalgorithm.
5. SJFCPUschedulingalgorithm.
6. RoundRobinCPUschedulingalgorithm.
7. PriorityCPUschedulingalgorithm.
8. Implement Semaphores.

REFERENCEBOOKS:

1. OperatingSystemPrinciplesbyAbrahamSilberschatz,Peter Galvin, GregGagne.
Seventh Edition, Wiley Publication
2. UnderstandingtheLinuxKernel,DanielPBovetandMarcoCesati,3rdEdition,Reilly,2005.
3. Unixprogramming, Stevens, Pearson Education.
4. Shellprogramming, YashwanthKanetkar.

COMPUTERORGANIZATIONLAB

DigitalLogicDesignExperiments

1. TTLCharacteristicsandTTL ICGates
2. Multiplexers&Decoders
3. Flip-Flops
4. Counters
5. BinaryAdders&Subtractors

8085/86AssemblyLanguageProgramming:

1. Additionoftwo8bitnumbers.
2. Additionoftwo16bitnumbers.
3. Sumofseries of8bitnumbers.
4. Subtractionoftwo8bitnumbers.
5. Largestnumberinanarray.

REFERENCEBOOKS:

1. ComputerSystemArchitecture:Morris Mano.
2. AdvancedMicroProcessorandPeripherals-Hall/AKRay.
3. ComputerOrganizationandArchitecture–WilliamStallingsSixthEdition,Pearson/PHI.
4. StructuredComputerOrganizationandDesign-AndrewS.Tanenbaum,4th Edition PHI/Pearson.

CourseCode&Title:23MCAT110 BRIDGE COURSE
FUNDAMENTALS OF COMPUTERS
Semester:I
CourseIndex: C110

Course Objectives:
Thelearningobjectivesofthiscourseare:

CourseObjectives
Learn the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming
Learn to develop techniques of writing algorithms pseudo codes and logic
Learn to Summarize the concepts of Operating Systems.
Learn to Recognize the Computer networks, types of networks and topologies, network devices and introduction to internet and email
Learn to Problem Solving and Programming.

Course Outcomes:
Bythe endofthecourse,thestudentwillbe

CourseIndex	CourseOutcomes
C110.1	Explain the concept of input and output devices of Computers and how it works and recognize the basic terminology used in computer programming
C110.2	Able to develop techniques of writing algorithms pseudo codes and logic
C110.3	Summarize the concepts of Operating Systems.
C110.4	Recognize the Computer networks, types of networks and topologies, network devices and introduction to internet and email.
C110.5	Able to Problem Solving and Programming.

SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA 23MCAT110 - BRIDGE COURSE
(ForGeneralB.Sc/B.A./B.ComStudents)

FUNDAMENTALSOFCOMPUTERS

Theory: 3Hrs/Week **Credits:4**
Internal:30 Marks **External:70Marks** **Total:100 Marks**

UNIT-I

Introduction to Computers: History of Computers, Central processing unit, Characteristics andlimitationsofcomputer,TypesofComputers,Typesofmemories.Blockdiagramof Computer,PeripheralDevices:Input,Outputandstorage,Inputdevices,Outputdevices, Secondarydevices, Communication between the CPU and Input/ Output devices. Software: Types of software. Number Systems (Binary, Octal, Hexadecimal).

UNIT-II

Operating System: Introduction to OS, Types of OS, Functions of OS, Evolution of Operating Systems - Simple Batch, Multi programmed, time-shared, Parallel, Distributed Systems, Real-Time Systems. MSDOS Internal Commands: chdir, cls, path, prompt, label, ver, vol, echo, set. External Commands: scandisk, discopy, diskcomp, format, backup, restore, Operating System installation steps.

UNIT-III

MS-Office Tools (Word, Excel & PowerPoint): Introduction of Word Processing, MSWord: Creating, Editing, printing, page formatting, inserting tables, pictures, Mail Merge. MS Excel: Introduction to spreadsheet, creating, formatting, printing, usage of formulae, Graphs of worksheets. MS PowerPoint: Creating a presentation with designs and animations.

UNIT IV

Computer Networks: Introduction to computer Networks, Network topologies -Bus topology,star topology, Ring topology, Mesh topology, Hybrid topology. Types of Networks: Local area Network, Wide Area Networks, Metropolitan Networks, Campus/ Corporate Area Network, Personal Area Network. Network Devices: Hub, Repeater, Switch, Bridge, Router, Gateway, Network interface Card.

Introduction to Internet: Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails. Web Browsers, Searching and Surfing, Creating an E-Mailaccount, sending and receiving E-Mails.

UNIT V

ProblemSolvingandProgramming: Algorithmdevelopment,Flowcharts,Looping, some programmingfeatures, Pseudo code, Structured Programming concepts.

ProgrammingLanguages: MachineLanguageandassemblylanguage,high-levelandlowlevel languages, Assemblers, Compilers and Interpreters.

TEXTBOOKS:

An Introduction to Computer studies –Noel Kalicharan-Cambridge.
Fundamentals of Computers –ReemaThareja-Oxford higher education.
Silberschatz,GalvinandGagne,"OperatingSystemsConcepts",Wiley.
Computer Networks: Tannenbaum.

REFERENCEBOOKS:

Peter Norton_s, Introductionto Computers, TataMcGraw Hill.
ComputerFundamentals,AnitaGoel,PearsonEducation,2017.

Course Code &Title: 23MCAP111 BRIDGE COURSE LAB
FUNDAMENTALS OF COMPUTERS
Semester: I
Course Index: C111

Course Objectives:
The learning objectives of this course are:

Course Objectives

Learn and Understand about the internal parts of computer, peripherals, I/O ports, connecting cables

Learn to install Operating System, able to write basic command line interface commands on MSDOS

Learn about Internet ,Browsing, Email

Learn to work on Office Tools such as Word processors, Spreadsheets and Presentation tools

Learn to Write Algorithms, Flow Charts for simple programs in C

Course Outcomes:
By the end of the course ,the student will be

Course Index	Course Outcomes
C111.1	Understand about the internal parts of computer, peripherals, I/O ports, connecting cables
C111.2	Able to install Operating System, able to write basic command line interface commands on MSDOS
C111.3	Know about Internet ,Browsing, Email
C111.4	Able to work on Office Tools such asWord processors, Spreadsheets and Presentation tools
C111.5	Able to Write Algorithms, Flow Charts for simple programs in C

SVKP&DrKSRAJUA&SCOLLEGE(A)::PENUGONDA

23MCAP111 - BRIDGE COURSE LAB
(ForGeneralB.Sc/B.A./B.ComStudents)

FUNDAMENTALSOFCOMPUTERS

Theory: 3Hrs/Week		**Credits:2**
Internal:50 Marks	**External:50Marks**	**Total:100 Marks**

Computer Hardware:

Experiment1: Identification of peripherals of a PC, Laptop, Server and Smart Phones
Experiment 2: Prepare a report containing the block diagram along with the configuration of each component and its functionality, Input/ Output devices, I/O ports and interfaces, main memory, cache memory and secondary storage technologies, digital storage basics, networking components and speeds.

Operating Systems:

Experiment 3: Operating System installation: Installing an Operating System such as Windows on Computer hardware.
Experiment 4: MSDOS Operating System Internal Commands: chdir, cls, path, prompt, label,ver, vol, echo, set.
Experiment 5: MSDOS Operating System External Commands: scandisk, discopy, diskcomp,format, backup, restore

Introduction of Internet:

Experiment6: Web Browsers, Searching and Surfing, Creating an E-Mail account, sending and receiving E-Mails.

Office Tools:

Experiment7: Office Tools: Demonstration and practice on Micro soft word.

Experiment 8: Demonstration and practice on Microsoft Excel.

Experiment9: Demonstration and practice on PowerPoint.

Introduction to Programming:

Experiment10:Write simple C Programs with Algorithms and Flow Charts

SVKP & Dr K S RAJU A & S COLLEGE (A) :: PENUGONDA

Master of Computer Applications(w.e.f. 2023)

Course Structure & Syllabus for AB 2023-24

Semester II (First Year) Curriculum

Code	Course Title	Max Marks		Total Marks	Hours per week		Credits
		External	Internal		Theory	Practical	
23MCAT201	Computer Networks	70	30	100	4	-	4
23MCAT202	Object Oriented Programming through JAVA	70	30	100	4	-	4
23MCAT203	Database Management Systems	70	30	100	4	-	4
23MCAT204	Formal Languages and Automata Theory	70	30	100	4	-	4
23MCAT205	Data Mining Concepts and Techniques	70	30	100	4	-	4
23MCAT206	Elective-I 1. Artificial Intelligence and Expert Systems 2. Internet of Things 3. Image Processing	70	30	100	4	-	4
23MCAP207	Object Oriented Programming through JAVA Lab	50	50	100	-	3	2
23MCAP208	Database Management Systems Lab	50	50	100	-	3	2
23MCAP209	Skill Development Course with Python	50	50	100	1	2	2
	Total Credits						30

Note: 2 lab Hrs and 1 Theory Hrs/Week or 2 Theory Hrs/ Week for Skill Development Course and only Lab Exam will be conducted.

Summer Internship (Mandatory) after First Year (to be evaluated during III Semester).

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Course Code &Title: 23MCAT201 COMPUTER NETWORKS
Semester: II
Course Index: C201

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the basics of computer networks and Data Communication.
To learn about Data Link Layer and IEEE Standards
To learn about design issues in Networks and Internet transport protocols
To learn about various Application layer protocols
To learn about various types of Network Devices and different types of Networks

Course Outcomes:
By the end of the course, the student will be

C201.1	Understand the basics of computer networks and Data Communication.
C201.2	Understand about Data Link Layer and IEEE Standards
C201.3	Understand the design issues in Networks and Internet transport protocols
C201.4	Understand various Application layer protocols.
C201.5	Overview of various types of Network Devices and different types of Networks

23MCAT201 COMPUTER NETWORKS

Instruction: 4Hrs/week	**Time: 3 Hours**	**Credits: 4**
Internal: 30Marks	**External: 70Marks**	**Total: 100Marks**

UNIT I

Introduction to Computer Networks: Introduction, Network Hardware, Network Software, Reference Models, Data Communication Services & Network Examples, Internet Based Applications.

Data Communications: Transmission Media, Wireless Transmission, Multiplexing, Switching, Transmission in ISDN, Broad Band ISDN, ATM Networks

UNIT II

Data Link Layer : Data Link Control, Error Detection & Correction, Sliding Window Protocols, LANs & MANs: IEEE Standards for LANs & MANs-IEEE Standards 802.2, 802.3, 802.4, 802.5, 802.6, High Speed LANs.

UNIT III

Design Issues in Networks: Routing Algorithms, Congestion Control Algorithms, Network Layer in the Internet, IP Protocol, IP Address, Subnets, and Internetworking.

Internet Transport Protocols: Transport Service, Elements of Transport Protocols, TCP and UDP Protocols, Quality of Service Model, Best Effort Model, Network Performance Issues.

UNIT IV

Application Layer : Over View of DNS, SNMP, Electronic Mail, FTP, TFTP, BOOTP, HTTP Protocols, World Wide Web, Firewalls.

UNIT V

Network Devices: Over View of Repeaters, Bridges, Routers, Gateways, Multiprotocol Routers, Brouters, Hubs, Switches, Modems, Channel Service Unit CSU, Data Service Units DSU, NIC, Wireless Access Points, Transceivers, Firewalls, Proxies.

Overview of Cellular Networks, Ad-hoc Networks, Mobile Ad-hoc Networks, Sensor Networks

Text Books:

1. Computer Networks, Andrews S Tanenbaum, Edition 5, PHI, ISBN: -81-203- 1165-5
2. Data Communications and Networking, Behrouz A Forouzan, Tata McGraw- Hill Co Ltd, Second Edition

Reference Books:

1. Computer Networks, Mayank Dave, Cengage.
2. Computer Networks, A System Approach, 5th ed, Larry L Peterson and Bruce S Davie, Elsevier.
3. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
4. Understanding Communications and Networks, 3rd Edition, W.A. Shay, Thomson.

Course Code & Title: 23MCAT202 Object Oriented Programming through JAVA

Semester: II

Course Index: C202

Course Objectives:

The learning objectives of this course are:

Course Objectives
Learn Introduction to basic concepts of OOP.
Learn about Inheritance, Interfaces, Packages and Enumeration.
Learn about Exceptions and MultiThreading.
Learn about Applets and Event Handling.
Learn about Abstract Window Toolkit and Swings.

Course Outcomes:

By the end of the course, the student will be

Course Index	Course Outcomes
C202.1	Understand Introduction to basic concepts of OOP.
C202.2	Understand about Inheritance, Interfaces, Packages and Enumeration.
C202.3	Understand about Exceptions and MultiThreading.
C202.4	Understand about Applets and Event Handling.
C202.5	Understand about Abstract Window Toolkit and Swings.

23MCAT202 Object Oriented Programming through JAVA

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 30 Marks **External: 70 Marks** **Total:100 Marks**

UNIT I

Introduction to OOP :Introduction, Principles of Object Oriented Languages, Applications of OOP, Programming Constructs: Variables, Primitive Data types, Identifiers- Naming Conventions, Keywords, Literals, Operators-Binary, Unary and ternary, Expressions, Precedence rules and Associativity, Primitive Type Conversion and Casting, Flow of control-Branching, Conditional, loops. Classes and Objects- classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments.

UNIT II

Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class.

Interfaces, Packages and Enumeration: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages, using Packages, Access protection, java.lang package.

UNIT III

Exceptions & Assertions : Introduction, Exception handling techniques- try… catch, throw, throws, finally block, user defined exceptions, Exception Encapsulation and Enrichment, Assertions.

MultiThreading: java.lang.Thread, The main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive () and join (), Synchronization, suspending and Resuming threads, Communication between Threads. **Input/Output**: reading and writing data, java.io package.

UNIT IV

Applets– Applet class, Applet structure, An Example Applet Program, Applet Life Cycle, paint(), update() and repaint().

Event Handling -Introduction, Event Delegation Model, java.awt.event Description, Sources of Events, Event Listeners, Adapter classes, Inner classes.

UNIT V

Abstract Window Toolkit :Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar.

Swing: Introduction, JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbedPane, Dialog Box Pluggable Look and Feel.

Text Books:

1. Programming in JAVA, Sachin Malhotra, Saurabhchoudhary, Oxford.
2. The Complete Reference Java, 8ed, Herbert Schildt, TMH

References:

1. JAVA for Beginners, 4e, Joyce Farrell, Ankit R. Bhavsar, Cengage Learning.
2. Introduction to Java programming, 7th ed, Y Daniel Liang, Pearson.

Course Code &Title: 20MCAT203 DATABASE MANAGEMENT SYSTEMS
Semester: II
Course Index: C203

Course Objectives:
The learning objectives of this course are:

Course Objectives

To learn about the Introduction of Database System, Data Modeling Using the Entity-Relationship Model.
To learn about Relational Data Model and Relational Database Constraints, Relational Algebra and Relational Calculus, Schema Definition, Basic Constraints and Queries.
To learn about mapping from ER to Relational, EER to relational, Schema Definition, Basic Constraints and Queries.
To learn about Relational Database Design, Indexing Structures for files.
To learn about Transaction Processing, Concurrency Control Techniques.

Course Outcomes:
By the end of the course, the student will be

C203.1	Able to understand the Introduction of Database System, Data Modeling Using the Entity-Relationship Model
C203.2	Able to understand Relational Data Model and Relational Database Constraints, Relational Algebra and Relational Calculus.
C203.3	Able to mapping from ER to Relational, EER to relational, Schema Definition, Basic Constraints and Queries
C203.4	Able to understand Relational Database Design, Indexing Structures for files
C203.5	Able to understand Transaction Processing, Concurrency Control Techniques

23MCAT203 DATABASE MANAGEMENT SYSTEMS

Instruction: 4Periods/week **Time:3 Hours** **Credits:4**
Internal:30 Marks **External:70Marks** **Total: 100Marks**

UNIT I

Database and Database Users: Data models, schemas, and instances, three-schemas architecture and data independence, database languages and interfaces, the database system environment, Centralized and client/server architectures for DBMSs, Classification of database management system.

Data Modeling Using the Entity-Relationship Model: Using High—Level Conceptual data model, Entity types, entity sets, Attributes and keys, Relationships types, relationship sets, roles and structural constraints, Weak Entity types, ER diagrams Meaning conventions and design issues, Enhance Entity Relationship model.

UNIT II

Relational data model and relational database constraints: Relational model constraints and relational schemas, update operations.

Relational Algebra and Relational Calculus: Unary Relational operations, Relational Algebra operations, Binary Relational operation, Additional Relational operation, Examples of Queries in Relational Algebra, Domain Relational Calculus.

UNIT III

Relational database design by ER and EER Relational Mapping: Relational database design using ER to Relational Mapping, Mapping EER Model Construct to Relations, **Schema Definition, Basic Constraints and Queries:** SQL Data definition, Specifying basic constraints in SQL, Schema change Statements in SQL, Basic queries in SQL, More complex SQL queries, INSERT DELETE UPDATE queries in SQL, Views in SQL, Data base stored Procedures

UNIT IV

Relational Database Design: Informal design Guide lines for Relation Schema, Functional Dependences, Normal forms based on Primary keys, General definitions of Second and Third Normal form, BOYCE-CODE Normal form, Algorithm for Relational database schema design, Multi-valued dependencies and fourth Normal forms,

File Organization and Indexes: Introduction, Secondary Storage Devices, Buffering Blocks, placing file records on disk, Operations on Files, Hashing Techniques, Parallelizing Disk Access using RAID Technology, Indexing Structures for files.

UNIT V

Algorithm for query processing and Optimization: Translating SQL Queries into Relational Algebra, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and SET Operations,

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Process, Transaction and System Concepts, Characterizing Schedules, Concurrency Control Techniques, Database Recovery Concepts, Recovery Techniques.

Text Book:

1. Fundamentals of Database System, Elmasri, Navathe, Pearson Education.

References Books:

1. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGraw- Hill.
2. Database Concepts, Abraham Silberschatz, Henry F Korth, S Sudarshan, McGraw-Hill

Course Code & Title: 23MCAT204 FORMAL LANGUAGES & AUTOMATA THEORY
Semester: II
Course Index: C204

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn the concept of Finite Automata and Regular Expressions,
Learn the concept of Regular sets &Regular Grammars.
Learn the concept of Context Free Grammars and Languages, Push down Automata
Learn about Turing Machines, Universal Turing Machines and Undecidability in detail.
Learn the concept of The Propositional calculus and The Predicate calculus.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C204.1	Understand the concept of Finite Automata and Regular Expressions .
C204.2	Understand the concept of Regular sets &Regular Grammars
C204.3	Understand the concept of Context Free Grammars and Languages, Push down Automata
C204.4	Understand about Turing Machines, Universal Turing Machines and Undecidability in detail.
C204.5	Understand the concept of The Propositional calculus and The Predicate calculus.

23MCAT204 FORMAL LANGUAGES & AUTOMATA THEORY

Instruction: 4 Periods/week **Time: 3 Hours** **Credits: 4**
Internal: 30 Marks **External: 70 Marks** **Total: 100 Marks**

UNIT-I

Finite Automata and Regular Expressions: Basic Concepts of Finite State Systems, Chomsky Hierarchy of Languages, Deterministic and Non-Deterministic Finite Automata, Finite Automata with ϵ-moves, Regular Expressions.

UNIT-II

Regular sets &Regular Grammars: Basic Definitions of Formal Languages and Grammars, Regular Sets and Regular Grammars, Closure Properties of Regular Sets, Pumping Lemma for Regular Sets, Decision Algorithm for Regular Sets, Minimization of Finite Automata.

UNIT-III

Context Free Grammars and Languages: Context Free Grammars and Languages, Derivation Trees, simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL's.

Push down Automata: Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

UNIT-IV

Turing Machines: The Definition of Turing Machine, Design and Techniques for Construction of Turing Machines, Combining Turing Machines.

Universal Turing Machines and Undecidability: Universal Turing Machines. The Halting Problem, Decidable & Undecidable Problems - Post Correspondence Problem.

UNIT-V

The Propositional calculus: The Prepositional Calculus : Introduction – Syntax of the Prepositional Calculus – Truth-Assignments – Validity and Satisfiability – Equivalence and Normal Forms – resolution in Prepositional Calculus.

The Predicate calculus: Syntax of the Predicate Calculate Calculus – Structures and Satisfiability – Equivalence – Un-solvability and NP-Completeness.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computations – J.E. Hopcroft, & J.D. Ullman , Pearson Education Asia.
2. Elements of The Theory Of Computation, Harry R Lewis, Cristos h. Papadimitriou, Pearson Education / Prentice-Hall of India Private Limited.

REFERENCE BOOKS:

1. Introduction to languages and theory of computation – John C. Martin (MGH)
2. Theory of Computation, KLP Mishra and N. Chandra Sekhar, IV th Edition, PHI
3. Introduction to Theory of Computation – Michael Sipser (Thomson Nrools/Cole)

Course Code &Title: 23MCAT205 DATA MINING CONCEPTS AND TECHNIQUES
Semester: II
Course Index: C205

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the overview of Data Warehouse and OLAP technology, Data Preprocessing.
To learn about the Data Transformation and Data Discretization , Introduction to Data Mining.
To learn about the Getting to know your Data, Concept Description.
To learn about the Mining Frequent Patterns, Associations and Correlations, Classification Basic Concepts
To learn about the Bayes Classification Methods, Classification by Back Propagation, Cluster Analysis.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C205.1	Able to understand about overview of Data Warehouse and OLAP technology, Data Preprocessing.
C205.2	Able to understand about the Data Transformation and Data Discretization , Introduction to Data Mining.
C205.3	Able to understand about the Getting to know your Data, Concept Description.
C205.4	Able to understand about the Mining Frequent Patterns, Associations and Correlations, Classification Basic Concepts
C205.5	Able to understand about the Bayes Classification Methods, Classification by Back Propagation, Cluster Analysis.

23MCAT205 DATA MINING CONCEPTS AND TECHNIQUES

Instruction:4Periods/week **Time:3Hours** **Credits: 4**
Internal:30Marks **External:70Marks** **Total: 100Marks**

UNIT I

Data Warehouse and OLAP Technology: An overview Data Warehouse Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Implementation

Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction

UNIT II

Data Transformation and Data Discretization, From Data Warehousing to Data Mining.

Introduction to Data Mining: Motivation and importance, what is Data Mining, Data Mining on what kind of data, what kinds of patterns can be mined, which technologies are used, which kinds of applications are targeted, Major issues in Data Mining.

UNIT III

Getting to know your Data: Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring data Similarity and Dissimilarity

Concept Description: Characterization and comparison What is Concept Description, Data Generalization by Attribute-Oriented Induction(AOI), AOI for Data Characterization, Efficient Implementation of AOI, AOI for Class comparisons.

UNIT IV

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Frequent Itemset Mining Methods: Apriori method, generating Association Rules, Improving the Efficiency of Apriori, Pattern-Growth Approach for mining Frequent Item sets, Mining Frequent Itemsets using vertical data format, Mining Closed and Max Patterns.

Classification Basic Concepts: Basic Concepts, Decision Tree Induction: Decision Tree Induction, Attribute Selection Measures, Tree Pruning

UNIT V

Bayes Classification Methods, Classification by Back Propagation, Support Vector Machines.

Cluster Analysis: Cluster Analysis, Partitioning Methods, Hierarchal methods, Density based methods-DBSCAN and OPTICS.

Text Book:

1. Data Mining Concepts and Techniques—JiaweiHan, MichelineKamber and Jian Pei,Morgan Kaufman Publications 3rd edition.

Reference Books:

1. Introduction to Data Mining –Pang-Ning Tan, Michael Steinbach, Vipin Kumar
2. Introduction to Data Mining, Adriaan, Addison Wesley Publication
3. Data MiningTechniques,A.K.Pujari,University Press.

Course Code &Title: 23MCAT206 INTERNET OF THINGS (Elective-I)
Semester: II
Course Index: C206

Course Objectives:
The learning objectives of this course are:

Course Objectives
To learn about the Introduction to Internet of Things, IoT Enabling Technologies, IoT Levels & Deployment Templates Domain Specific IoTs
To learn about the IOT & M2M, SNMP
To learn about the IoT Platforms Design Methodology
To learn about the IoT Physical Devices & Endpoints
To learn about Cloud Storage Models, WAMP, DJango, SkyNetIoTMessaging Platform.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C206.1	Able to understand about the Introduction to Internet of Things, IoT Enabling Technologies, IoT Levels & Deployment Templates Domain Specific IoTs
C206.2	Able to understand about the IOT & M2M, SNMP
C206.3	Able to understand about the IoT Platforms Design Methodology
C206.4	Able to understand about the IoT Physical Devices & Endpoints
C206.5	Able to understand about Cloud Storage Models, WAMP, DJango, SkyNetIoTMessaging Platform.

23MCAT206 INTERNET OF THINGS (Elective-I)

Instruction:4Periods/week **Time:3Hours** **Credits: 4**

Internal: 30Marks **External:70Marks** **Total: 100Marks**

UNIT-I

Introduction to Internet of Things: Definition & Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates

UNIT-II

IOT & M2M: Domain Specific IoTs: Home, Cities, Environment, Energy systems, Logistics, Agriculture, Health & Lifestyle. Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT, Need for IoT Systems Management.

UNIT-III

SNMP & NETCONF-YANG & IoT Design Methodology: Simple Network Management Protocol (SNMP), Limitations of SNMP, Network Operator Requirements, NETCONF-YANG, IoT Systems Management with NETCONF-YANG, NETOPEER. **IoT Design Methodology**, Case Study on IoT System for Weather Monitoring.

UNIT-IV

Motivation for Using Python, IoT Systems : Logical Design using Python, Installing Python , Python Data Types & Data Structures ,Control Flow , Functions, Modules, Packages, File Handling, Date/Time Operations , Classes ,Python Packages of Interest for IoT.

IoT Physical Devices & Endpoints: Raspberry Pi , About the Board , Linux on Raspberry Pi, Raspberry Pi Interfaces , Programming Raspberry Pi with Python , Other IoT Devices,

UNIT-V

IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs , WAMP - AutoBahn for IoT, Xively Cloud for IoT, Python Web Application Framework - Django, Designing a RESTful Web API, Amazon Web Services for, SkyNetIoTMessagingPlatform.

Text Book:

1. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

Reference Book:

1. Fundamentals of Python, K.A.Lambert and B.L.Juneja, Cengage Learning, 2012

Course Code & Title: 23MCAP207 Object Oriented Programming through JAVA Lab
Semester: II
Course Index: C207

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn how to write programs in Java using OOP.
Learn how to write programs related to real life scenario.
Learn how to write programs in Java using Inheritance and using Adapter classes.

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C207.1	Students can able to write programs in Java using OOP.
C207.2	Students can able to code programs related to real life scenario.
C207.3	Students can able to code programs in Java using Inheritance and using Adapter classes.

23MCAP207 Object Oriented Programming through JAVA Lab

Instruction: 3 Periods/week **Time: 3 Hours** **Credits: 2**
Internal: 50 Marks **External: 50 Marks** **Total:100 Marks**

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1. a) Write A Java Program to print Quadratic roots using command line arguments.

   b) Write a java program to print multiplication table using arrays.

2. Write a java program to find the volume of a Box using method overloading with different number of parameters.

3. Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. If Num1 or Num2 is not an integer, the program would throw a Number Format Exception. If Num2 is Zero, program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.

6. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.

7. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

8. Write a java package for book class and then import and display the result.

9. Write a Java program to illustrate the multiple inheritance by using Interfaces.

10. Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

Course Code &Title: 23MCAP208 DATABASE MANAGEMENT SYSTEMS LAB
Semester: II
Course Index: C208

Course Objectives:
The learning objectives of this course are:

Course Objectives
Learn how to write SQL queries using DDL, DML, DCL commands
Learn how to write SQL queries on aggregate and conversion functions
Learn how to write PL/SQL programs on exception handling, control structures
Learn how to write PL/SQL programs on cursors, procedures, triggers.

Course Outcomes:
By the end of the course, the student will be

C208.1	Able to write SQL queries using DDL, DML, DCL commands
C208.2	Able to write SQL queries on aggregate and conversion functions
C208.3	Able to write PL/SQL programs on exception handling, control structures
C208.4	Able to write PL/SQL programs on cursors, procedures, triggers.

23MCAP208 DATABASE MANAGEMENT SYSTEMS LAB

Practical: 3Periods/week **Time: 3Hours** **Credits: 2**
Internal: 50Marks **External: 50Marks** **Total: 100Marks**

SQL

1) Simple queries to understand DDL, DML and DCL commands
2) Creation, altering and dropping of tables and inserting rows in to a table (use constraints while creating tables) examples using SELECT command.
3) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
4) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping ofViews.
5) Queries using Conversion functions like (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions like (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

PL/SQL

1) Simple programs to understand PL/SQL
2) Write a PL/SQL program to demonstrate exception–handling
3) Demonstrate the working of COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
4) Develop a program that includes the features NESTED IF, CASE and CASE expression.
5) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATIONERROR.
6) Programs using CURSORS
7) Programs development using creation of procedures and functions.
8) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers

Text Books:

1. Oracle Database 11g, Jason Price, Oracle Press
2. Oracle PL/SQL for Dummies, Michael Rosenblum, Paul Dorsey, Wiley Publications.

Course Code &Title: 23MCAP209 SKILL DEVELOPMENT COURSE WITH PYTHON
Semester: II
Course Index: C209

Course Objectives:
The learning objectives of this course are:

Course Objectives
To introduce to the basics of Python Programming language
To discuss various functions and methods of Python Programming
To learn about Multithread Programming and GUI Programming
To study Web Programming and Database Programming

Course Outcomes:
By the end of the course, the student will be

Course Index	Course Outcomes
C209.1	Able to understand the basics of Python Programming language
C209.2	Able to use various functions and methods of Python Programming
C209.3	Able to comprehend Multithread Programming and GUI Programming
C209.4	Able to understand Web Programming and Database Programming

23MCAP209 SKILL DEVELOPMENT COURSE WITH PYTHON

Instruction: 3Hrs/week	**Time: 3 Hours**	**Credits: 2**
Internal: 50 Marks	**External: 50 Marks**	**Total: 100 Marks**

List of Experiments:

1. Write Python a program that takes input and prints its sum, multiplication, subtraction, division and remainder values.
2. Write a Python program to find the square root of a number by Newton's Method.
3. Write a Python program biggest of three numbers.
4. Write a Python program to find the sum of digits of a given number.
5. Write a Python program to find the GCD of two numbers.
6. Write a Python program to print the following pattern.

```
        1
      2   2
    3   3   3
  4   4   4   4
5   5   5   5   5
```

7. Write a Python program to find Factorial of a given number.
8. Write a Python program to print all the prime numbers below the given number.
9. Write a Python program to count the numbers of characters in the string using loop.
10. Write a Python program to read a string from the user and print lower case character in upper case and upper case character in lower case.
11. Write a Python program to perform Linear Search.
12. Write a Python program to perform Binary Search.
13. Write a Python program to sort perform bubble sort.
14. Write a Python program to perform selection sort.
15. Write a Python program to demonstrate try with multiple exception statements.

TEXTBOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Mark Lutz, "Learning Python", O Reily, 4th Edition, 2009.

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1. Tim Hall and J-P Stacey,"Python 3 for Absolute Beginners", 2009.
2. Magnus Lie Hetland, "Beginning Python: From Novice to Professional", 2nd Edition, 2009.